**DESIGNING A WATER STORAGE FACILITY**

**DUE DATE: *\_\_\_\_\_\_\_\_\_\_\_\_\_***

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| **NAME** |  | **CLASS** |  | **DATE** |  |

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| **You will be assessed on the following criteria:** | | |
| **Criterion B**: *Investigating Patterns (max 6)* | ***Your level:*** |  |

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| **YOUR TASK: Design a water storage facility for a village in a Third World country.** |

**TASK DETAILS:**

* *The storage facility must be sufficient for the needs of a village of fifty families.*
* *The storage facility must be able to contain a two-week supply of water.*
* *The walls, base and roof of the storage facility will be made out of metal sheet that costs $14 per square metre.*
* *The storage container is to be placed on a 20 cm thick concrete floor. The floor is to be rectangular and must hold the entire base of the storage container. The concrete costs $640 per square metre.*
* *You must keep the cost as low as possible.*

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You will need to do the following:

* **Research** and **estimate** the water needs for fifty families in the country where your village is located. Don’t forget to state your sources and assumptions you have made in your report.
* **Calculate** the total volume of water needed for two weeks for fifty families.
* **Consider what solid** you would like your storage container to be. Explain why have you chosen this solid.
* **Determine the dimensions** for your storage container:
  + Keep in mind that you need to minimize the cost of your storage facility.
  + Show calculations (and perhaps even a graph) on a spreadsheet to show why your dimensions meet the above requirements.
  + Describe any patterns that you see in your calculations when performing your calculations to achieve the best dimensions for your container.
* **Write a report** clearly communicating your process, design and justification.

Your report should contain the following sections:

* **Introduction** explaining the purpose of your report and provide background on your village.
* **Diagram** showing the dimensions of your design for the water storage facility, and a short explanation as to why you have chosen this solid.
* **Spreadsheet calculations** that show your dimensions meet the requirements. You must submit two spreadsheets – one with the numbers and the other with formulas. Include your graph in this section as well.
* **Discussion** of patterns and relationships that you see in your data. Use your trends and patterns to justify your design.

**To obtain the highest level for the following criteria you will need to do the following:**

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| **Criteria** | **Level** | **Descriptors** | **Indicators** |
| ***Criterion B***  **INVESTIGATING PATTERNS** | **0** | * You have not reached a standard described below. | * You have not reached a standard described below. |
| **1 – 2** | * You have used basic inquiry techniques to solve the problem. * You have shown a small part of your working out with guidance from the teacher. | * You have provided few reasons for your choice of solid used for your water storage facility. * Your spreadsheet shows that you have investigated few aspects of the problem. * You have performed and shown few calculations. * You have described simple patterns/relationships that you see, but you have not made reference to your data to support findings. * You are not able to justify your design. |
| **3 – 4** | * + You have used basic inquiry techniques to solve the problem.   + You are able to recognize simple patterns with teacher guidance.   + You have shown part of your working out and demonstrated some understanding of your findings. | * You have provided some reasons for your choice of solid used for your water storage facility. * Your spreadsheet shows that you have investigated some aspects of the problem. * You have correctly some performed and shown your calculations. * You have described simple patterns/relationships that you see and make reference to relevant data. * You make few references to findings in justifying your design. |
| **5 – 6** | * + You have used inquiry techniques to solve the problem.   + You are able to recognize simple patterns in different situations.   + You are able to arrive at a single result and make predictions based on extension of the patterns you see.   + You can describe relationships from the simple patterns you see. | * You have provided a logical explanation for your choice of solid used for your water storage facility. * Your spreadsheet shows your inquiry process to find the dimensions that will minimize the cost of the storage facility. * You have correctly performed and shown your calculations. * You are able to describe patterns/relationships that you see with some reference to your data. * You make some references to your findings in justifying your design. |
| **7 – 8** | * + You have selected and applied specific inquiry techniques to solve the problem.   + You are able to recognize patterns in different situations.   + You are able to arrive at a single result and make predictions consistent with your findings.   + You can describe simple patterns as mathematical relationships or general rules. | * You have provided a logical and detailed explanation for your choice of solid used for your water storage facility. * Your spreadsheet details your inquiry process to find the dimensions that will minimize the cost of the storage facility. * You have correctly performed and shown your calculations. * You are able to describe patterns/relationships that you see in detail and make reference to relevant data. * You make many references to your findings in justifying your design. |

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| **SELF-ASSESSMENT** | **B** | **STUDENT COMMENT:**    **Parents’ signature:** |